SURDS and INDICES

A: I know what a surd is.

Which of the following are surds?
$\sqrt{16}$, $\sqrt{30}$, $\sqrt{23}$, $\sqrt{6400}$, $\sqrt{2}$
Why?

B: I can simplify a surd.

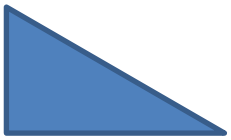
Simplify:
$\sqrt{12}$, $\sqrt{75}$, $\sqrt{1000}$, $\sqrt{147}$, $\sqrt{99}$, $\sqrt{117}$

C: I can simplify expressions involving surds.

Simplify:
a) $3\sqrt{7} + 2\sqrt{7}$ b) $\sqrt{45} + \sqrt{80}$
c) $\sqrt{50} - \sqrt{28}$ d) $\sqrt{63} - 2\sqrt{7}$
e) $\sqrt{3} \times \sqrt{5}$ f) $\sqrt{7} \times \sqrt{7}$
g) $\sqrt{8} \times \sqrt{2}$ h) $2\sqrt{2} \times 3\sqrt{5}$
i) $\frac{\sqrt{50}}{\sqrt{2}}$ j) $\frac{\sqrt{54}}{\sqrt{3}}$
k) $(\sqrt{2} + 3)(\sqrt{2} - 1)$ l) $(3\sqrt{3} - 1)(5\sqrt{3} + 2)$

D: I can solve problems involving surds.

Calculate the length of the hypotenuse, leave your answer as a surd in its simplest form.



Calculate the area of the rectangle.

E: I can rationalise the denominator.

Rationalise the denominator:-
$\frac{3}{\sqrt{5}}$ $\frac{2}{\sqrt{7}}$ $\frac{10}{\sqrt{50}}$ $\frac{\sqrt{12}}{\sqrt{20}}$ $\frac{\sqrt{8}}{\sqrt{32}}$ $\frac{2}{3\sqrt{5}}$ $\frac{3}{4\sqrt{6}}$

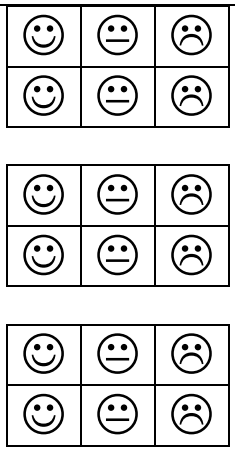
$\frac{3}{\sqrt{5}+1}$ $\frac{10}{\sqrt{3}-2}$ $\frac{8}{4+\sqrt{2}}$

F: I can simplify expression involving multiplying and dividing terms with indices.

Simplify:-
a) $x^3 \times x^7$ b) $x^{12} \times x^{-8}$ c) $x \times x^4 \times x^5$
d) $4x^6 \times 3x^{14}$ e) $x^{15} \div x^7$ f) $x^{-8} \div x^{11}$
g) $\frac{x^{10}}{x^4}$ h) $\frac{9x^7}{3x^{12}}$ i) $\frac{x^2y^5}{x^3y^2}$
j) $\frac{2x^5y^6z}{8x^7y}$ k) $\frac{27a^5b^{13}c^8}{6a^2b\ c^9}$

G: I can simplify a term with an index to another power.

a) $(x^3)^2$ b) $(x^{-4})^5$ c) $(3x^5)^2$
d) $(2y^3)^3$ e) $(x^3y)^6$ f) $(4a^{-2})^2$

H: I know the value of a term to the power of zero. **I:** I can express a term with a negative power to a term with a positive power. **J:** I can express a term with a fractional index as a surd (and vice versa).		Evaluate:- 2^0, 7^0 , x^0 , $3x^0$, x^3 x x^{-3} Evaluate:- 3^{-2} , 2^{-3} , $\frac{1}{4^{-2}}$ Express with positive powers:- 3^{-6}, 6^{-1}, x^{-7}, x^{-12}, $3x^{-5}$, x^2y^{-7}, $\frac{1}{2}x^{-3}$ Evaluate:- $25^{\frac{1}{2}}$, $8^{\frac{1}{3}}$, $16^{\frac{3}{2}}$, $4^{-\frac{1}{2}}$, $9^{-\frac{3}{2}}$ Express as a surd:- $x^{\frac{1}{2}}$, $x^{\frac{3}{2}}$, $x^{\frac{4}{5}}$, $2x^{-\frac{3}{4}}$, $8a^{\frac{5}{7}}$ Express in index form:- $\sqrt{x}$, $\sqrt[3]{x}$, $\sqrt[5]{x^2}$, $\sqrt[3]{8^2}$, $3\sqrt[6]{x^5}$, $\frac{1}{\sqrt[3]{x^2}}$
Surds $\sqrt{a} \times \sqrt{b} = \sqrt{(a \times b)}$ $\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$ **Rules of indices** $a^m \times a^n = a^{m+n}$ $a^m \div a^n = a^{m-n}$ $(a^m)^n = a^{mn}$ $a^0 = 1$ $a^{-m} = \frac{1}{a^m}$ and $\frac{1}{a^{-m}} = a^m$ $a^{\frac{1}{n}} = \sqrt[n]{a}$ and $a^{\frac{m}{n}} = \sqrt[n]{a^m}$		